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Current Support Brief

COMMUNIST CHINA'S PROGRAM
TO EQUIP NITROGEN FERTILIZER PLANTS IN TROUBLE



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COMMUNIST CHINA'S PROGRAM
TO EQUIP NITROGEN FERTILIZER PLANTS IN TROUBLE

Actions taken thus far in 1963 reveal that Communist China is stumbling badly in its attempt to equip and complete, with its own resources, large nitrogen fertilizer plants. An effort has been made to finish seven plants that were started during 1958-60, but to date only two have reached the stage of trial production of fertilizer. This slow progress is the result of a decidedly inadequate domestic supply of equipment. During February, in an attempt to increase the supply of this necessary equipment, more than 100 machine building enterprises, some of which had previously made equipment for other industries, were ordered to undertake immediate production of various equipment for the nitrogen fertilizer industry and were allocated additional capital construction funds for this purpose. Shortly thereafter a nation-wide conference was called between representatives of the chemical and machine building industries for the purpose of discussing technical problems and procedures and of expediting the work to be done. Despite these corrective measures, no conspicuous improvement in output of the complex, high-quality equipment specially required in the nitrogen fertilizer industry is expected in the next year or two. Peiping admits that the remodeling and expansion of many of the "more than 100" enterprises needed to accommodate the new production line will take several years. In addition, time will be required for the personnel of these enterprises to gain experience in producing equipment of high uniform standards, and China must solve chronic problems of inadequate technology, shortage of materials, and inefficiencies of management and labor.

1. Construction Program Far Behind Schedule

Communist China has fallen far short of the expansion hoped for in its development program for the chemical fertilizer industry during and after the years of the Second Five Year Plan (1958-62). In 1958-60, construction was initiated on seven large and a number of small nitrogen

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fertilizer plants. All of these plants are claimed to be designed by Chinese engineers, and all are to be equipped with machinery made in China. Numerous small plants with annual capacities of either 800 or 2,000 tons of synthetic ammonia are now in operation, but little progress has been made in completing the larger plants, most or all of which are designed for initial annual capacities of 25,000 tons of synthetic ammonia and 100,000 tons of ammonium sulfate. In mid-1961, Peiping announced that three of the large plants, located at K'ai-feng, Canton, and Ch'u-hsien (in Chekiang Province), would be completed by the end of that year. 1/ Today, however, only the Canton Nitrogen Fertilizer Plant, which began trial production of fertilizer in April 1963, is finished. Only one other large nitrogen plant, the Wu-ching Chemical Plant in Shanghai, has completed its first stage of construction, and this plant in November 1962 2/ began trial production of fertilizer.

2. Inadequate Supply of Equipment

Chinese statements and actions leave little doubt that the long delay in finishing the large nitrogen plants -- some incomplete after more than 4 years in construction -- is the result of China's inability to acquire the necessary equipment. Although the Chinese have incessantly claimed since 1957 that all vital equipment for the nitrogen fertilizer industry could be made domestically, large plants are nevertheless standing uncompleted and awaiting equipment. 3/ The USSR and several Satellites have delivered nitrogen fertilizer equipment, but such deliveries have gone chiefly to Bloc aid projects located at Kirin, Lan-chou, T'ai-yuan, and Ch'in-tang (near Ch'eng-tu). These plants, all of which are in at least partial operation, are much larger than those China itself is building. Moreover, although Chinese trade delegations have been "shopping" for some time in Western Europe and Japan, no purchases of nitrogen fertilizer equipment are known to have been made. Consequently, the burden of supply continues to rest on China's own machine building industry.

Although China has openly discussed some of its problems in the domestic manufacture of nitrogen fertilizer equipment -- and indications are that such difficulties will persist for some time -- Peiping

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claimed on 9 July that output of this equipment was greater in the first half of 1963 than in all of 1962. 4/ The significance of this unqualified, and perhaps contradictory, assertion is not clear, but it is doubtful that the claim includes an absolute increase in output of types of equipment considered to be major chronic bottlenecks. These types include especially those items made of certain kinds of special-alloy steels and capable of being in continuous operation for long periods of time under the high pressures and temperatures involved in the ammonia synthesis process. Some of the problems encountered in manufacturing this equipment in Shanghai, a major producing center of such equipment, were described in the February issue of the technical journal Chi-hsieh Kung-yen (Machine Building Industry). 5/ Various inadequacies and inefficiencies associated with production of equipment for the nitrogen fertilizer industry, given as major reasons for the qualitative problems in the equipment supplied to the plants at Wu-ching and Ch'u-chou [Ch'u-hsien], probably are representative of conditions in general in China. Specific shortcomings were listed as follows: (a) lack of manufacturing experience, (b) inadequate knowledge of the special technical and quality requirements, (c) insufficiently clear requirements in orders for equipment, (d) inadequate machinery and measuring instruments for production, (e) incorrect materials used and poor quality of materials, (f) lack of attention to quality control of product by plant personnel at all levels, (g) no uniformity in quality of product, (h) poor organization in production, (i) confused management, (j) insufficient cooperation among producing plants, (k) revisions made in designs without concurrence of the design staff, (l) incomplete inspection of product before shipment, (m) submitting new technical requirements after product is completed, and (n) poor care in transport of equipment.

3. Corrective Measures Undertaken

Recognizing that future prospects for raising agricultural yields depend heavily on increasing the supply of chemical fertilizers, especially nitrogen fertilizer, and aware that the main bottleneck for completing large plants was the shortage of equipment, Peiping belatedly gave high priority this year to the manufacture of this type of equipment.

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In February a major step was taken when more than 100 machinery and electrical equipment enterprises in some 18 provinces and cities were ordered to undertake immediate production of the specific parts and complete units of equipment that make up the complex assembly required for large nitrogen fertilizer plants. Some of the enterprises had to convert their production lines because they had previously made equipment for other industries, and for this purpose the state reportedly provided increases in capital construction funds. Furthermore, plans call for "scores" of enterprises to be remodeled or expanded with equipment to be added in the "next few years." 6/ Types of equipment that are or will be made in these enterprises include compressors, containers, valves, pipes, and fittings that can withstand high pressures (above 300 atmospheres) and temperatures (above 400°C), ammonia synthesis towers, air-separation units, water gas generator sets, pumps, blowers, large electric motors, electrical accessories, and control instruments.

To accelerate the transfer of the limited knowledge and experience that China possesses in this field of the machine industry, a nation-wide conference was held at Shanghai from 21 February to 2 March between representatives of the Ministry of Chemical Industry, the First Ministry of Machine Building, and the Shanghai Committee for Industrial Production. The reported purpose of the conference was to consider and exchange experiences on such topics as (a) production and uses of complete sets of nitrogen fertilizer equipment, (b) solutions to existing technical problems of production, (c) prescribed control methods for the design, manufacture, and inspection of equipment, and (d) plans for development of new types of equipment. 7/

4. Conclusions

The order for "more than 100" machine building enterprises to undertake immediately the production of equipment for synthetic ammonia and nitrogen fertilizer plants and the calling of a nation-wide conference are positive corrective measures but ones that cannot be expected to improve significantly the supply of such equipment for some time. Many of these enterprises will have to be remodeled or expanded, and this process, by Chinese admission, will take place

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over the "next few years." Moreover, the personnel of most of the enterprises in question have had little or no experience in the manufacture of high-pressure and other custom equipment for large nitrogen plants, and gaining such experience will also require time. In addition, China has not yet solved its chronic problems of inadequate technology, shortage of materials, and inefficiencies of management and labor. Such problems will act to retard the output and lower the quality of the equipment produced and thereby delay final assembly and proper function of large nitrogen fertilizer plants.

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